



IITA



IPGRI

Farmers practice of domestication and their contribution to improvement of Yam in West Africa

Third six-monthly report - August 2002

CGIAR Systemwide Program on Participatory Research and Gender Analysis for Technology Development and Institutional Innovation



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1. Identifying Information:

Project Title: Farmers practice of domestication and their contribution to improvement of Yam in West Africa.

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Collaborating Institutions:

The project report is jointly submitted by IPGRI and IITA in collaboration with:

- Bariba, Nago and Fon farmers selected through surveys.
- Universite National du Benin in collaboration with ORSTOM.
- Institut National des Recherches Agricoles du Benin (INRAB).
- CIRAD-IITA Yam Research Co-ordination Unit (YRCU).

2. Achievements and constraints:

- Summarize the results of ongoing activities
- Highlight achievements & breakthroughs

Since the last report, one of the main breakthroughs in the project has been a clearer understanding of the genetic material involved in the domestication process through the morphological and biochemical characterization of the material (Mignouna and Dansi, accepted by Euphytica).

The study looked at 68 newly domesticated yams. Of these 16 were morphologically and 14 biochemically identical to known landraces, 27 were found to be similar to some landraces, but not identical, and 25 were completely different. Forty-four of the new varieties were considered worthy cultivars and had been "released". The rest were still being tested. This thereby confirms for the first time that the domestication process does indeed contribute significant *new* diversity to the system. Who is judging the cultivars as worthy or not? Who is testing them?

Eight individual clones were judged to have been derived from *D. abyssinica*, four from *D. Burkilliana* and 56 from *D. praehensilis*. Again, who undertook this evaluation? This is in roughly the same proportion as these species exist in the natural surroundings of the studied villages.

In addition to the above analysis, molecular analysis has been carried out on wild, intermediate and domesticated material by University of Benin staff at CIRAD in Montpellier using AFLPs, and by IITA using microsatellites and RAPDs. The results of these analyses have not yet been made available to the compiler of this report, but the AFLP studies have resulted in two papers at a symposium in Benin (see section on dissemination of results below). These studies are expected to throw additional light on the relationship between wild and domesticated yams. What is the project's relation to these studies?

Two theses have been completed on local knowledge and indigenous practice in the genetic improvement of yams at the National University of Benin. Did the project contribute to these theses? If so, how? One of the theses focused on the prefecture of Sinendé while the other dealt with the prefecture of Banté, both in Benin. Both theses provide: a conceptual framework and methodology for their research; a presentation of the environment in the study areas; a detailed description of yam production and varietal diversity in the study areas; and an overview and analysis of the role of yam domestication in the studied yam systems.

The theses confirm many earlier observations. Highlights of *new* findings from these two theses include:

- In Banté in the northern part of the country, all the domesticated yams represented a limited range of double-harvest yam originating from wild *D. abyssinica*, which exists wild in the area. Other varieties were assumed to originate from other parts of the country.
- In Sinendé, further south, domesticated varieties came from both *D. abyssinica* and *D. praehensilis*. Only early varieties appear to result from domestication in this area.
- Domesticating farmers are found equally distributed among the best, the medium and the poorly skilled yam growers, as defined by the community. Are there indications as to the reasons for the even distribution?
- There is no relationship between the amount of diversity a farmer has and whether or not he domesticates (or has domesticated) yams. Why?
- Contrary to the findings of previous research that have found yam to be a luxury crop, the farmers with the largest area of yams in the study areas were among the poorer farmers in these communities. Wealthier farmers grew cotton and cashew nuts. Why?
- In Sinendé domesticators were primarily found among middle income farmers, while in Banté they were predominantly poor farmers. Why?

The results of these theses have been presented in three symposium papers listed in section 3. Can any conclusions can be drawn from the theses results that would shed light on strategies for addressing the food security needs of poor farmers? Are there any lessons from these studies on participation or gender?

Further to the research on the efficiency of yam domestication presented in the previous report, IITA and INRAB have studied the cost of domestication. This initially involved the 80 farmers participating in the original baseline study reported in the previous report and was followed up with an intensive study of 10 of these farmers. Why was the follow up only on 10 farmers?

The broad-based study estimated the unit cost of the domestication of wild yam at Fcfa187 per kg (\$0.27per kg). This amount represents 220 % of the market price of the seed yam for cultivated yam varieties in the same area. So it is more economical to buy planting material from the existing varieties than from the domestication of wild yams, if the cost of production was the only factor involved in that decision.

Seen from the point of view of seed multiplication, domestication seems like a complicated way of getting planting material only practiced by a very few eccentric farmers. However, seen as a source of new genetic diversity brought in from the wild and compared to domestication practices in other crops around the world, yam domestication seems to be a relatively simple process carried out by an extraordinarily large number of people. Any idea how many people? What motivates them to domesticate if it is more costly and complicated? What other factors influence their decision and manage to override cost incentives?

- Describe constraints/set backs experienced (include comments on current capacity to carry out pre-established workplan)

Three computers used by participants in the project have crashed, apparently due to a virus circulating within the project, with the loss of data that could have been used to improve the analysis of the project and better illustrate the main conclusions. These are: the computer on which the two students carried out their research (hard copies of the theses exist); the computer with the characterization data for Dansi and Mignouna's research; and the computer of Phillippe Vernier (CIRAD-IITA).

3. Communication and Dissemination of Information

- Summarize events held or attended during the reporting period (training programmes, workshops / seminars) and the activities undertaken at these events
- Give details of peer reviews, scientists contacted and other mechanisms for successfully disseminating results to target groups

Five papers were presented at the International Symposium on Participatory Plant Breeding and Dynamic Genetic Resources Management in Sub-Saharan Africa held in Bouaké, May, 2001: Did the project contribute to this research? If so, how?

- HOUNDEKON & MANYONG : Indigenous knowledge and domestication of wild yams in West Africa: experience from Benin Republic.
- S. TOSTAIN, M.N. NASSER, F.K. OKRY, R.L. MONGBO, O. DAINOU, C. AGBANGLA : La Culture de l'igname et la gestion des varietes dans le systeme traditionnel de production agricole de deux sous-prefectures du Benin: Sinende et Bante
- S. TOSTAIN, M.N. NASSER, F.K. OKRY, R.L. MONGBO, O. DAINOU, C. AGBANGLA : La domestication des ignames sauvages.
- P. VERNIER, G.C ORKWOR, DOSSOU A.R. : An overview of the farmers' knowledge of yam domestication in Benin and Nigeria
- S. TOSTAIN, O. DAINOU, C. AGBANGLA : Sur les ignames spontanees *Dioscorea abyssinica* Hochst.

The project also arranged for the participation of a yam domesticating farmer at the symposium.

Four papers from the project were presented at a symposium on yam cultivation held in Benin in November 2001. The proceedings are presently being edited and will be published:

- S. TOSTAIN, C. AGBANGLA & O. DAÏNOU : Les ignames *Dioscorea abyssinica* et *D. praehensilis* en Afrique de l'Ouest. Diversité génétique estimée par des marqueurs AFLP 16 p.
- S. TOSTAIN, N.M. BACO, F.K. OKRY, R.L. MONGBO, C. AGBANGLA & O. DAÏNOU : La gestion dynamique des variétés d'ignames dans le système traditionnel de production de deux sous-préfectures du Bénin : Sinendé et Banté 17 p.
- S. TOSTAIN, F.K. OKRY, N.M. BACO, R.L. MONGBO, C. AGBANGLA & O. DAÏNOU : Savoirs locaux et pratiques endogènes : la « domestication » des ignames

sauvages (*Dioscorea abyssinica*) dans les sous-préfectures de Sinendé et de Banté au Bénin 22 p.

S. TOSTAIN, C. AGBANGLA, N.M. BACO, F.K. OKRY & O. DAÏNOU : Etude des relations entre ignames sauvages et ignames cultivées (*Dioscorea* sp.) dans deux sous-préfectures du Bénin à l'aide de marqueurs AFLP 16 p.

A paper has recently been accepted for publication in the journal Euphytica:

H.D. MIGNOUNA & A. DANSI : Yam (*Dioscorea* sp.) domestication by the Nago and Fon ethnic groups in Benin.

4. Additional comments:

- Any additional information the reporter feels should be included in the six monthly report

The present project has recently been selected as a case study for the selection of best practices in on-farm conservation of landraces in arid and semi-arid areas of Africa. This is part of UNEP-GEF funded project including eight countries in Africa. It will also offer the opportunity for comparison with yam domestication in Ghana.

Note: A limit of five pages excluding graphs and tables has been set for these reports.